BIO 25 PAL Worksheet
Week 5 (#2): Membrane Potentials & Synapses

Remember

In a normal cell, there are electrochemical gradients acting on K^+ and on Na^+. What are they? **Draw a cell and indicate the overall gradient (including relative size) acting upon each ion.**

1. What is the difference between a leak channels and a gated-channel? What are the types of things that can cause a gated channel to open?

2. How do graded potentials differ from action potentials? Draw one of each, using a RMP of -70 mV as a starting point. Assume threshold is at -55 mV.

Understand

A *synapse* is the connection by which a nerve cell sends its signal to 1) another nerve cell, 2) a muscle cell, or 3) a gland. The synapse itself is actually the tiny space between structures, and a *neurotransmitter* is the chemical released from structure #1 to structure #2.

3. Draw the axon of a neuron, and have it connect to a muscle cell. On your drawing, indicate the following:

1. Where the neurotransmitter is stored in the the presynaptic neuron
2. What causes it to be released into the synaptic space
3. What causes the neurotransmitter to move across the space
4. What happens when the neurotransmitter lands on the post-synaptic membrane (that is, the membrane of the muscle cell).

Apply

Neurotransmitters may open chemically-gated ion channels, and thus may change the potential on the post-synaptic membrane.

A post-synaptic potential may be excitatory (EPSP, or Excitatory Post-Synaptic Potential), or inhibitory (IPSP – Inhibitory Post-Synaptic Potential), depending on which ion channels open. Draw each of the scenarios below.

4. What ions move across the postsynaptic membrane during an EPSP?

5. What ions move across the postsynaptic membrane during an IPSP?

6. If you wanted to move a muscle, would this be an EPSP or an IPSP?